Kramer Electronics, Ltd.

USER MANUAL

Model:

TP-400FW

FireWire Range Extender

Contents

1	**Introduction**	**1**
2	**Getting Started**	**1**
3	**Overview**	**2**
4	**Your TP-400FW FireWire Range Extender**	**3**
5	**Using Your TP-400FW FireWire Range Extender**	**4**
5.1	Connecting 2 FireWire Devices via 2 TP-400FW Units	4
5.2	Connecting 2 FireWire Devices via Several TP-400FW Units	6
6	**Technical Specifications**	**8**

Figures

Figure 1: TP-400FW FireWire Range Extender 3
Figure 2: Connecting 2 FireWire Devices (Standard 4.5m Range) 4
Figure 3: Connecting 2 FireWire Devices via 2 TP-400FW Units (Extended 100m Range)6
Figure 4: Connecting 2 FireWire Devices via 3 TP-400FW Units (Extended 200m Range)7

Tables

Table 1: Front Panel TP-400FW FireWire Range Extender Features 4
Table 2: Rear Panel TP-400FW FireWire Range Extender Features 4
Table 3: Technical Specifications of the TP-400FW FireWire Range Extender 8

1 Introduction

Welcome to Kramer Electronics (since 1981): a world of unique, creative and affordable solutions to the infinite range of problems that confront the video, audio and presentation professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 350-plus different models now appear in 8 Groups[1], which are clearly defined by function. Congratulations on purchasing your Kramer **TP-400FW** *FireWire Range Extender*, which is ideal for:

- Digital video production, editing studios, and digital video live broadcasting
- PC FireWire port extensions and long cable drivers

The package includes the following items:

- **TP-400FW** *FireWire Range Extender*
- One 6 pin to 6 pin Connector Cable[2], a power cord[3], and this user manual

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables[4]

1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters and GROUP 11: Sierra Products

2 The original FireWire standard defines a cable with identical 6 pin connectors at both ends that can be plugged in either direction, between nodes, and carries the signal and the power. In the IEEE 1394a supplement, two kinds of FireWire 4 pin connector cable became available without the power pins: a 6 pin connector at one end and a 4 pin connector at the other end, and 4 pin connectors at both ends

3 We recommend that you use only the power cord that is supplied with this machine

4 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com

3 Overview

The high quality **TP-400FW** is a unique FireWire Range Extender that lets you extend the standard 4.5m (13.5ft) FireWire range considerably: to up to 100m (300ft) with 2 interconnected units, and up to 200m (600ft) with 3 interconnected units, etc., using inexpensive, widely used CAT 5 cable. The **TP-400FW** features a set of 4 connection status LEDs.

Using the **TP-400FW** you can:

- Access the FireWire port from both the front and rear panels
- Interconnect up to six **TP-400FW** units (together with the FireWire sources/acceptors) that derive their power from the first local **TP-400FW** unit, with a total current of up to 1.5A/12V

The **TP-400FW** *FireWire Range Extender* is based on FireWire which:

- Is a serial bus standard[1] that enables quick universal interfacing between digital video, audio and data, and computer hardware items[2]
- Is simple to use and operates independently of the host system letting you connect items for extended distances
- Supports Plug and Play[3], hot swapping[4] and isochronous[5] and asynchronous applications

In particular, the **TP-400FW**:

- Supports the provisions of the IEEE 1394a-2000 and 1394-1995 Standards for the High Performance 1394 Serial Bus
- Supports the provisions of the IEEE 1394b-2002 Standard at S100 signaling rates
- Enables 1394 100Mbps signals to be transmitted and received across an extended range on shielded twisted pair cable
- Includes built-in protection from electrostatic discharge (ESD)[6] for all FireWire and CAT 5 lines, by suppressing all transient high voltages down to the allowed level. In particular, ESD protection for high-speed data lines to IEC 61000-4-2 (ESD) 15kV (air), 8kV (contact), IEC

1 Originally developed by Apple™ and published as IEEE 1394 by the Institute of Electrical and Electronics Engineers

2 Hardware items include digital cameras, computers, printers, VCRs, CD-ROMs, hard disks, scanners and graphic cards

3 Configures automatically. Whenever a device is added or removed the 1394 bus re-enumerates

4 You can connect and disconnect inputs and outputs dynamically, without having to restart the PC or cycle power

5 Video / audio applications require constant transfer rates, which the serial bus provides by supporting isochronous transfers

6 When connecting a "live" DV source to a receptor, an electrical potential difference or any other element could create a high voltage (such as ESD or a live chassis) which could permanently damage one or both of the connected devices. This high voltage may be seen as a spark occurring at the instant of connection, or may not be seen at all, but nevertheless can result in costly damage

61000-4-5 (Lightning) 12A (8/20us), and IEC 61000-4-4 (EFT) 40A (5/50ns)

To achieve the best performance:

- Avoid interference from neighboring electrical appliances that may adversely influence signal quality
- Position your Kramer **TP-400FW** away from moisture, excessive sunlight and dust

4 Your TP-400FW FireWire Range Extender

Figure 1, Table 1 and Table 2 define the **TP-400FW**:

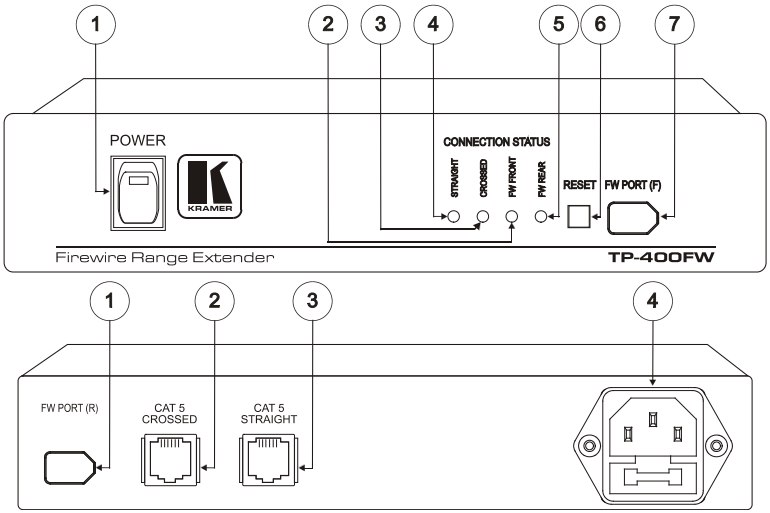

Figure 1: TP-400FW FireWire Range Extender

Table 1: Front Panel TP-400FW FireWire Range Extender Features

#	Feature		Function
1	*POWER* Switch		Illuminated switch for turning the unit ON or OFF
2	*CONNECTION STATUS* (Green) LEDs	*STRAIGHT*	Lights when a connection is established using a CAT5 cable that connects to the *STRAIGHT* RJ45 Connector
3		*CROSSED*	Lights when a connection is established using a CAT5 cable that connects to the *CROSSED* RJ45 Connector
4		*FW FRONT*	Lights when a connection is established between a fully functioning FireWire device and the FireWire port on the front panel (item 7 in Table 1)
5		*FW REAR*	Lights when a connection is established between a fully functioning FireWire device and the FireWire port on the rear panel (item 1 in Table 2)
6	*RESET* Button		Reboots the setup (without having to disconnect and reconnect the power)
7	*FW PORT (F)*		Connects to the FireWire device

Table 2: Rear Panel TP-400FW FireWire Range Extender Features

#	Feature	Function
1	*FW PORT (R)*	Connects to the FireWire device
2	*CAT 5 CROSSED* RJ45 Connector	Connects to the CAT 5 Straight connector on another TP-400FW unit
3	*CAT 5 STRAIGHT* RJ45 Connector	Connects to the CAT 5 Crossed connector on another TP-400FW unit
4	Power Connector with *FUSE*	AC connector enabling power supply to the unit

5 Using Your TP-400FW FireWire Range Extender

The standard FireWire range between two FireWire devices is limited to 4.5m (13.5ft), as Figure 2 illustrates:

Figure 2: Connecting 2 FireWire Devices (Standard 4.5m Range)

5.1 Connecting 2 FireWire Devices via 2 TP-400FW Units

You can interconnect a pair of FireWire devices (for example, a Webcam and a PC) over an extended range of up to 100m (300ft), using two **TP-400FW** units, as Figure 3 illustrates.

To interconnect a pair of **TP-400FW** units using twisted pair CAT 5 cable (commonly used for Ethernet connections), do the following:

1. On each **TP-400FW** unit, connect[1] the power cord[2] and turn the unit ON. **It is possible to connect the power cord to only one of the TP-400FW units. (In this case, the other TP-400FW unit will derive its power from that unit via the CAT-5 cable). The CAT-5 STRAIGHT connector is always the source of the power, and the CAT-5 CROSSED connector is always the acceptor of the power**.
2. Connect the CAT-5 Straight RJ45 connector on the first **TP-400FW** unit to the CAT-5 Crossed RJ45 connector on the second **TP-400FW** unit, **when using a straight pin to pin cable** with RJ-45 connectors[3].
   If you are using a **crossover cable** with RJ-45 connectors, connect the CAT-5 Straight RJ45 connector on the first **TP-400FW** unit to the CAT-5 Straight RJ45 connector on the second **TP-400FW** unit[4].
3. Connect a FireWire device (for example, a PC) to the FW PORT (R) or (F) on the first **TP-400FW** unit, and a FireWire device (for example, a Webcam) to the FW PORT (R) or (F) on the second **TP-400FW** unit.
4. Be sure that the source and acceptor are powered-up (from their own power supply or via the **TP-400FW** FireWire bus).
   The relevant CONNECTION STATUS green LEDs light (see items 2, 3, 4 and 5 in Table 1).

Notes:

- Apply the same rules for both source and destination FireWire equipment (that is, first connect the power to both **TP-400FW** units and only then connect the Firewire cables)
- When reconnecting two **TP-400FW** units, first disconnect the cable, and only then reconnect them
- Wait 5 seconds (after completing all the connections) for the picture to appear on the destination device. If the picture fails to appear on the destination device after 5 seconds, press the *RESET* Button to reboot the setup.
  Wait another 5 seconds for the picture to appear on the destination device

1 Not illustrated in Figure 3

2 We recommend that you use only the power cord that is supplied with this machine

3 Alternatively, connect the CAT-5 Crossed RJ45 connector on the first TP-400FW unit to the CAT-5 Straight RJ45 connector on the second TP-400FW unit

4 Alternatively, connect the CAT-5 Crossed RJ45 connector on the first TP-400FW unit to the CAT-5 Crossed RJ45 connector on the second TP-400FW unit

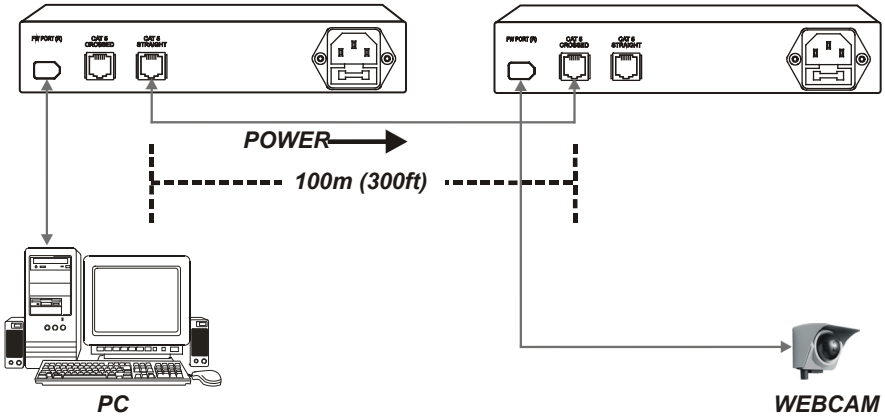

Figure 3: Connecting 2 FireWire Devices via 2 TP-400FW Units (Extended 100m Range)

5.2 Connecting 2 FireWire Devices via Several TP-400FW Units

You can interconnect multiple **TP-400FW** units to extend the FireWire range. Each additional **TP-400FW** extends the range up to a further 100m. For example, Figure 4 illustrates how three **TP-400FW** units may be used to extend the FireWire range to 200m.

To interconnect three **TP-400FW** units using twisted pair CAT 5 cable (commonly used for Ethernet connections), do the following:

1. On each **TP-400FW** unit, connect[1] the power cord[2] and turn the unit ON. (It is possible to connect the power cord to only one of the **TP-400FW** units. The other **TP-400FW** units will derive their power from that unit).
2. Connect the CAT 5 Straight RJ45 connector on the first **TP-400FW** unit to the CAT 5 Crossed RJ45 connector on the second **TP-400FW** unit, and connect the CAT 5 Straight RJ45 connector on the second **TP-400FW** unit to the CAT 5 Crossed RJ45 connector on the third **TP-400FW** unit[3].
3. Connect a FireWire device (for example, a video camcorder) to the FW PORT (R) on the first **TP-400FW** unit, and a FireWire device (for example, a PC) to the FW PORT (F) on the third **TP-400FW** unit.

1 Not illustrated in Figure 4

2 We recommend that you use only the power cord that is supplied with this machine

3 Alternatively, connect the CAT 5 Crossed RJ45 connector on the first TP-400FW unit to the CAT 5 Straight RJ45 connector on the second TP-400FW unit, and connect the CAT 5 Crossed RJ45 connector on the second TP-400FW unit to the CAT 5 Straight RJ45 connector on the third TP-400FW unit

4. Be sure that the power on each device is turned ON.
   The relevant CONNECTION STATUS green LEDs light (see items 2, 3, 4 and 5 in Table 1) as follows:
   - On the first **TP-400FW** unit, the *STRAIGHT* and the *FW REAR* LEDs
   - On the second **TP-400FW** unit, the *STRAIGHT* and the *CROSSED* LEDs
   - On the third **TP-400FW** unit, the *CROSSED* and the *FW FRONT* LEDs

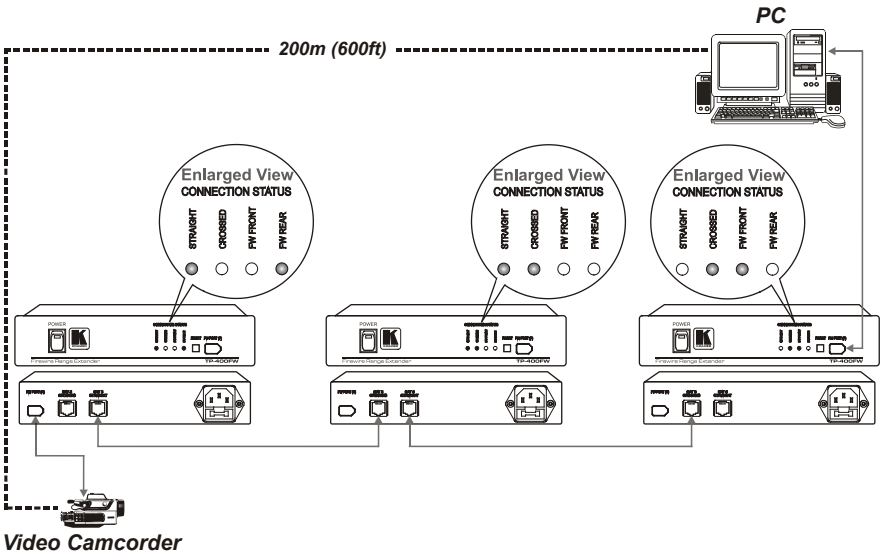

Figure 4: Connecting 2 FireWire Devices via 3 TP-400FW Units (Extended 200m Range)

6 Technical Specifications

Table 3 includes the technical specifications:

Table 3: Technical Specifications[1] *of the TP-400FW FireWire Range Extender*

PORTS:	One Front Panel and Rear Panel 6-pin serial 1394 port 2 RJ45 CAT-5 ports
TRANSFER RATE:	100Mbps
IEEE-1394 STANDARDS:	IEEE 1394a-2000, IEEE 1394-1995, IEEE 1394b-2002 @ up to 100Mbps
ESD LINE PROTECTION:	IEC 61000-4-2 (ESD) 15kV (air), 8kV (contact), IEC 61000-4-5 (Lightning) 12A (8/20us), and IEC 61000-4-4 (EFT) 40A (5/50ns)
POWER SOURCE:	230 VAC, 50/60 Hz. (115VAC, U.S.A.) 30VA
DIMENSIONS:	22cm x 18cm x 4.5cm (8.7" x 7" x 1.7") W, D, H.
WEIGHT:	1.3 kg (2.9 lbs.) approx.
ACCESSORIES:	Power cord
OPTIONS:	RK 80 19" rack kit

1 Specifications are subject to change without notice

LIMITED WARRANTY

The warranty obligations of Kramer Electronics for this product are limited to the terms set forth below:

What is Covered

This limited warranty covers defects in materials and workmanship in this product.

What is Not Covered

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Kramer Electronics to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover cartons, equipment enclosures, cables or accessories used in conjunction with this product.

Without limiting any other exclusion herein, Kramer Electronics does not warrant that the product covered hereby, including, without limitation, the technology and/or integrated circuit(s) included in the product, will not become obsolete or that such items are or will remain compatible with any other product or technology with which the product may be used.

How Long Does this Coverage Last

Seven years as of this printing; please check our Web site for the most current and accurate warranty information.

Who is Covered

Only the original purchaser of this product is covered under this limited warranty. This limited warranty is not transferable to subsequent purchasers or owners of this product.

What Kramer Electronics will do

Kramer Electronics will, at its sole option, provide one of the following three remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Kramer Electronics will also pay the shipping costs necessary to return this product once the repair is complete.
2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product.
3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

What Kramer Electronics will not do Under This Limited Warranty

If this product is returned to Kramer Electronics or the authorized dealer from which it was purchased or any other party authorized to repair Kramer Electronics products, this product must be insured during shipment, with the insurance and shipping charges prepaid by you. If this product is returned uninsured, you assume all risks of loss or damage during shipment. Kramer Electronics will not be responsible for any costs related to the removal or re-installation of this product from or into any installation. Kramer Electronics will not be responsible for any costs related to any setting up this product, any adjustment of user controls or any programming required for a specific installation of this product.

How to Obtain a Remedy under this Limited Warranty

To obtain a remedy under this limited warranty, you must contact either the authorized Kramer Electronics reseller from whom you purchased this product or the Kramer Electronics office nearest you. For a list of authorized Kramer Electronics resellers and/or Kramer Electronics authorized service providers, please visit our web site at www.kramerelectronics.com or contact the Kramer Electronics office nearest you.

In order to pursue any remedy under this limited warranty, you must possess an original, dated receipt as proof of purchase from an authorized Kramer Electronics reseller. If this product is returned under this limited warranty, a return authorization number, obtained from Kramer Electronics, will be required. You may also be directed to an authorized reseller or a person authorized by Kramer Electronics to repair the product.

If it is decided that this product should be returned directly to Kramer Electronics, this product should be properly packed, preferably in the original carton, for shipping. Cartons not bearing a return authorization number will be refused.

Limitation on Liability

THE MAXIMUM LIABILITY OF KRAMER ELECTRONICS UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY. Some countries, districts or states do not allow the exclusion or limitation of relief, special, incidental, consequential or indirect damages, or the limitation of liability to specified amounts, so the above limitations or exclusions may not apply to you.

Exclusive Remedy

TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS LIMITED WARRANTY AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF KRAMER ELECTRONICS CANNOT LAWFULLY DISCLAIM OR EXCLUDE IMPLIED WARRANTIES UNDER APPLICABLE LAW, THEN ALL IMPLIED WARRANTIES COVERING THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THIS PRODUCT AS PROVIDED UNDER APPICABLE LAW.

IF ANY PRODUCT TO WHICH THIS LIMITED WARRANTY APPLIES IS A “CONSUMER PRODUCT” UNDER THE MAGNUSON-MOSS WARRANTY ACT (15 U.S.C.A. §2301, ET SEQ.) OR OTHER APPICABLE LAW, THE FOREGOING DISCLAIMER OF IMPLIED WARRANTIES SHALL NOT APPLY TO YOU, AND ALL IMPLIED WARRANTIES ON THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR THE PARTICULAR PURPOSE, SHALL APPLY AS PROVIDED UNDER APPLICABLE LAW.

Other Conditions

This limited warranty gives you specific legal rights, and you may have other rights which vary from country to country or state to state.

This limited warranty is void if (i) the label bearing the serial number of this product has been removed or defaced, (ii) the product is not distributed by Kramer Electronics or (iii) this product is not purchased from an authorized Kramer Electronics reseller. If you are unsure whether a reseller is an authorized Kramer Electronics reseller, please visit our Web site at www.kramerelectronics.com or contact a Kramer Electronics office from the list at the end of this document.

Your rights under this limited warranty are not diminished if you do not complete and return the product registration form or complete and submit the online product registration form. Kramer Electronics thanks you for purchasing a Kramer Electronics product. We hope it will give you years of satisfaction.

For the latest information on our products and a list of Kramer distributors, visit our Web site www.kramerelectronics.com
where updates to this user manual may be found.
We welcome your questions, comments and feedback.

Caution

Safety Warning:
Disconnect the unit from the power supply before opening/servicing.

P/N: 2900-000005 Rev: 2

Kramer Electronics, Ltd.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com
P/N: 2900-000005 REV 2